Status of EMCAL Project Files

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L2 Managers Meeting

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Status of the EMCAL Project Files – BoE documents

- BOE documents for UIUC Block Production (WBS 1.3.2) and BNL Module Production and Sector Assembly (WBS 1.3.3) have been produced and are being updated.
- Most fixed cost materials are catalog items (hardware, epoxies, etc)
- We have quotes for larger commodity items such as Tungsten and scintillating fiber
- And manufactured items like meshes and lightguides
- Labor estimates are scaled up estimates based on experience with prototype production

sPHENIX Detector
Relativistic Heavy Ion Collider
BASIS of ESTIMATE (BoE)

L2 Project Name	L2 WBS Number	L3 Project Name (Control Account)	L3 WBS Number
EMCAL	1.3	EMCAL Module Production and S	1.3.3

Work Package Name	WBS Number	Basis of Estimate Link
Set Up Module Production, sector Assmbly a	1.3.3.1	Set Up Area
EMCAL Module Production	1.3.3.2	EMCAL Module Production
EMCAL Sector Assembly	1.3.3.3	EMCAL Sector Assembly

	B	C	D	E	F	
1	Description	Item	Vendor	Total	Status	Basis of E
2	EMCal Module Production					
3	EMCAL Prototype V2.1 Module Production					
4	Procure light guides for V2.1 prototype	mold tooling	NN Inc	$17,950		quote
5		per part $ 6.83 x 1000		$6,830		quote
6	Install mounting studs v2.1 prototype blocks	set screw 10-32 ss 1.25" mounting stud	McMaster	$7		catalog/
7		3M DP460 epoxy	McMaster	$25		catalog/
8		1/4" spherical washers	McMaster	$68		catalog/
9		10-32 ss nuts and washers	McMaster	$9		catalog/
10		2-56 set screws and nuts	McMaster	$15		catalog/
11						
12	design & produce LG gluing fixtures	light guide glueing fixtures	BNL			3D printe
13	modify V2.0 enclosure for V2.1					
14	Prepare and install light guides on v2.1 prototype blocks	Saint Gobain BC600 optical epoxy	Saint Gobain	$65		catalog
15	Install reflectors and glue v2.1 prototype blocks	Vikuity Mirror film	Vikuity	$52		catalog
16		Saint Gobain BC600 optical epoxy	Saint Gobain	$65		catalog
17	Install SiPMs & daughterboards on v2.1 prototype blocks	Momentive RTV615 couplant	Momentive	$350		catalog
18						
19						
20	EMCAL PreProduction Prototype Module Production					
21						
22	Procure light guides for preproduction prototype modules	single tower				
23		mold cost (repolish?)	NN Inc		paid	quote
24		part cost - use remainder from V2.1	NN Inc		paid	quote
25						
26	Procure mechanical parts for preproduction prototype modules	set screw 10-32 ss 1.25" mounting stud	McMaster	$40		catalog
27		10-32 ss nuts and washers	McMaster	$72		catalog/
28		3M DP460 epoxy	McMaster	$200		catalog
29		1/4" spherical washers	McMaster	$544		catalog

Status of the EMCAL Project Files – WBS Dictionary

WBS DESCRIPTIONS / DEFINITIONS HAVE BEEN ADDED TO "NOTES" FIELD THE <= LEVEL 5 ITEMS IN THE PROJECT FILE

	WBS	Task Name	Duration	Start	Finish	Predecessors	Successors	Constraint Date	Resource Names	Cost	Fixed Cost	Notes
1	1.3.1	EMCAL Management	396 days	Wed 2/1/17	Fri 8/31/18			NA		$0	$0	
2	1.3.1.1	CD0 Authorization	0 days	Wed 2/1/17	Wed 2/1/17		15FS+41 days,16FS	NA		$0	$0	
3	1.3.1.2	CD-1, CD-2a/CD-3a Review	0 days	Fri 6/30/17	Fri 6/30/17			Fri 6/30/17		$0	$0	
4	1.3.1.3	CD-1, CD-2a/CD-3a Authorization	0 days	Thu 11/30/17	Thu 11/30/17			Thu 11/30/17		$0	$0	
5	1.3.1.4	CD-2b/CD-3b Review	0 days	Fri 6/29/18	Fri 6/29/18			Fri 6/29/18		$0	$0	
6	1.3.1.5	CD-2b/CD-3b Authorization	0 days	Fri 8/31/18	Fri 8/31/18		40FS-120 days,42FS	Fri 8/31/18		$0	$0	
7	1.3.2	EMCAL Block Production	858 days	Thu 3/16/17	Fri 8/21/20			NA		$5,585,758	$0	TECHNICAL SCOPE: ...
8	1.3.2.2	EMCAL Prototype V2.1 Block Production	85 days	Thu 3/16/17	Mon 7/17/17			NA		$0	$0	TECHNICAL SCOPE: ...
13	1.3.2.3	EMCAL Preproduction Prototype Block Production	141 days	Thu 3/23/17	Wed 10/11/17			NA		$185,753	$0	TECHNICAL SCOPE: ...
39	1.3.2.4	EMCAL Final Block Production	612 days	Tue 3/13/18	Fri 8/21/20			NA		$5,400,004	$0	TECHNICAL SCOPE: ...
123	1.3.3	EMCAL Module Production and Sector Assembly	918 days	Wed 3/1/17	Fri 10/30/20			NA		$8,100,379	$0	TECHNICAL SCOPE: ...
124	1.3.3.1	Set up module production, sector assembly and test area	50 days	Fri 6/9/17	Mon 8/21/17			NA		$8,347	$0	TECHNICAL SCOPE: ...
125	1.3.3.1.4	Set up module production and sector assembly areas	50 days	Fri 6/9/17	Mon 8/21/17	2FS+90 days	127FS-5 days	NA	SCI3 PO[5%],TECH3 PO	$4,052	$0	TECHNICAL SCOPE: ...
126	1.3.3.1.5	Set up test area	50 days	Fri 6/9/17	Mon 8/21/17	2FS+90 days	127FS-5 days	NA	SCI3 PO[5%],TECH3	$4,052	$0	TECHNICAL SCOPE: ...
127	1.3.3.1.6	Safety Review of Assembly and Test Areas	5 days	Tue 8/15/17	Mon 8/21/17	126FS-5 days,125FS-5	148	NA	SCI 4[5%],SCI3 PO[5%]	$243	$0	TECHNICAL SCOPE: ...
128	1.3.3.2	EMCAL Module Production	898 days	Wed 3/1/17	Fri 10/2/20			NA		$5,488,100	$0	TECHNICAL SCOPE: ...
129	1.3.3.2.1	EMCAL Prototype V2.1 Module Production	101 days	Wed 3/1/17	Mon 7/24/17			NA		$33,096	$0	TECHNICAL SCOPE: ...
141	1.3.3.2.3	EMCAL Preproduction Prototype Module Production	176 days	Thu 3/16/17	Thu 11/23/17			NA		$293,539	$0	TECHNICAL SCOPE: ...
154	1.3.3.2.4	EMCAL Final Module Production	631 days	Tue 3/27/18	Fri 10/2/20			NA		$5,161,466	$0	TECHNICAL SCOPE: ...
166	1.3.3.3	EMCAL Sector Assembly	895 days	Mon 4/3/17	Fri 10/30/20			NA		$2,603,932	$0	
167	1.3.3.3.1	EMCAL Prototype v2.1 Assembly	128 days	Fri 6/16/17	Wed 12/20/17			NA		$28,318	$0	TECHNICAL SCOPE: ...
177	1.3.3.3.3	EMCAL Preproduction Prototype Sector Assembly and testing	244 days	Mon 4/3/17	Mon 3/26/18			NA		$206,438	$0	TECHNICAL SCOPE: ...
193	1.3.3.3.4	EMCAL Final Sector Assembly	895 days	Mon 4/3/17	Fri 10/30/20			NA		$2,369,176	$0	TECHNICAL SCOPE: ...
209	1.3.4	Install sectors into sPHENIX	0 days	Wed 11/4/20	Wed 11/4/20	208		Wed 11/4/20		$0	$0	

Status of the EMCAL Project Files – “Bottoms Up” Contingency Estimate

- We have been adding contingencies for materials – catalog items and commodities to the BoE documents
- Have most line item contingencies, need to sum them up
- Labor estimates for block production and module production are scaled up estimates based on experience with prototype production doing the same tasks
- The process of scaling up from v2.1 prototype to Pre-production prototype to full production will allow us to refine these estimates as we increase the scale and gain more experience with production

Status of the EMCAL Project Files – Other CD-1 Documents

- Still needs work:
  - BoE details – integrate labor/resource rates and contingencies from the Project file
  - Link summary numbers from detail pages to summary page
  - Edit WBS Dictionary definitions
  - Update budgetary quotes for large items (Tungsten Powder, fiber, meshes) with delivery schedules
  - Finalize lightguide design

- To stay on schedule, we will need to get an early start with long, labor intensive "preparation" items like:
  - filling fiber meshes
  - preparing lightguides (machining, drilling/tapping, polishing)
  - characterizing sipms (measuring gain, Vop)